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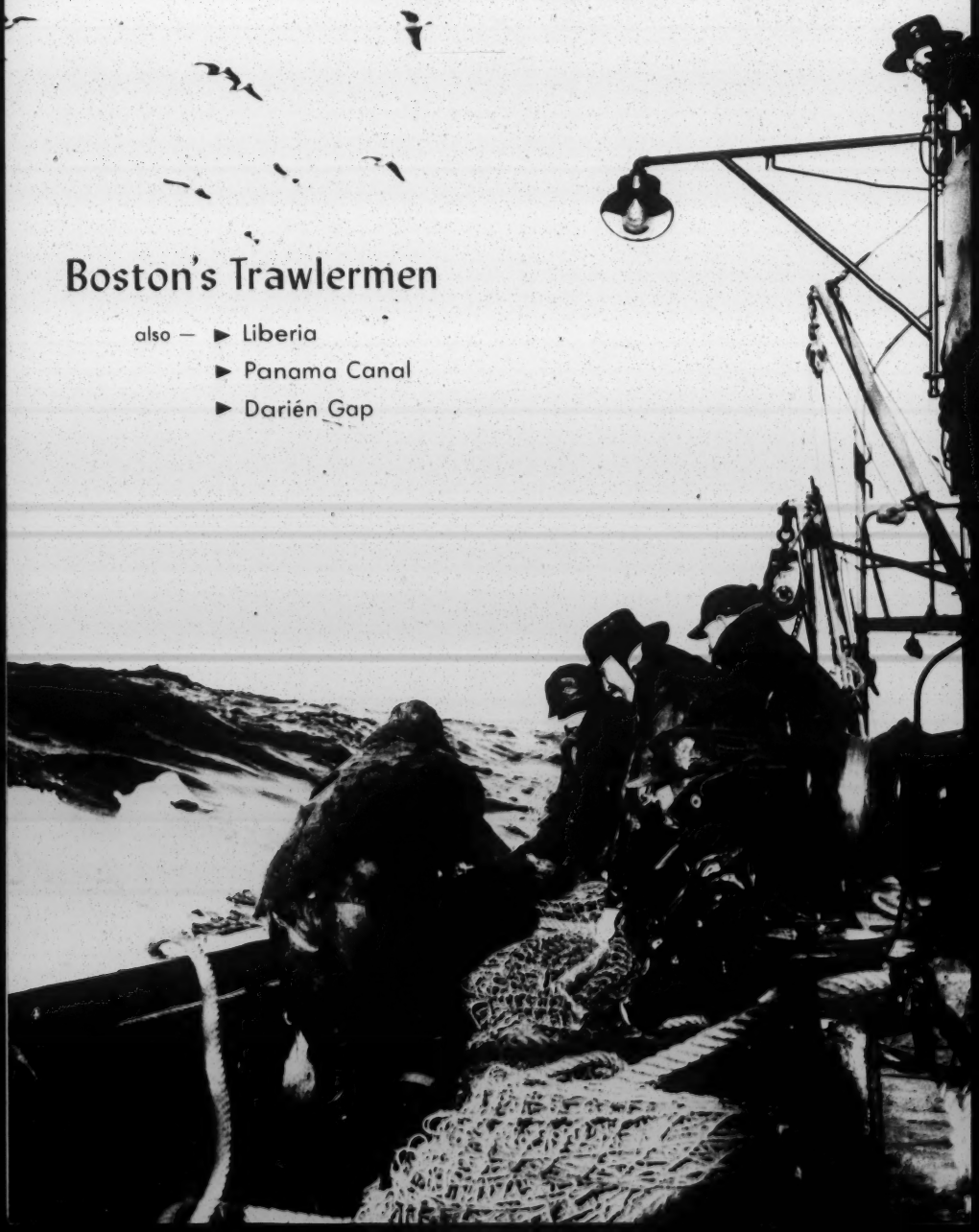


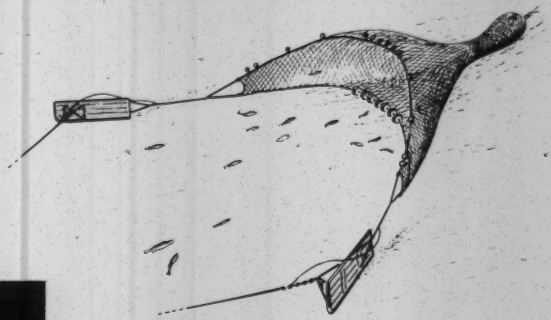
Boston's Trawlermen

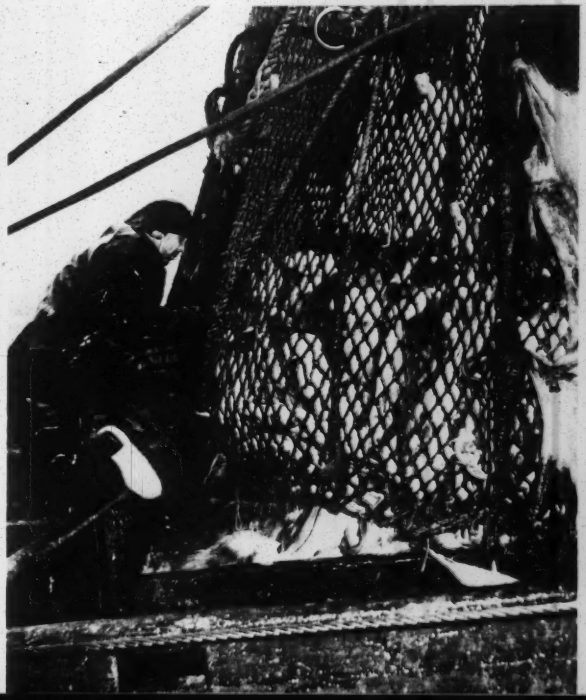
also — ► Liberia
► Panama Canal
► Darién Gap

"A good set!" the fisherman shouts when the cod end surfaces well away from the ship. The buoyancy of a large catch overcomes the dead weight of net and gear. The net is hoisted over the deck and a writhing, silvery mass of fish cascades into the fish pens, right. Satisfied fishermen, at far right, admire a 20-pound cod.

cod end knot, and hundreds of pounds of fish tumble into removable partitions called pens, below. These prevent the catch from sliding about the deck when the vessel rolls.

Crewmen armed with short-handled fish forks wade knee-deep through the squirming mass. Haddock, cod, and pollock are separated from flounder, herring, ocean perch, whiting, and





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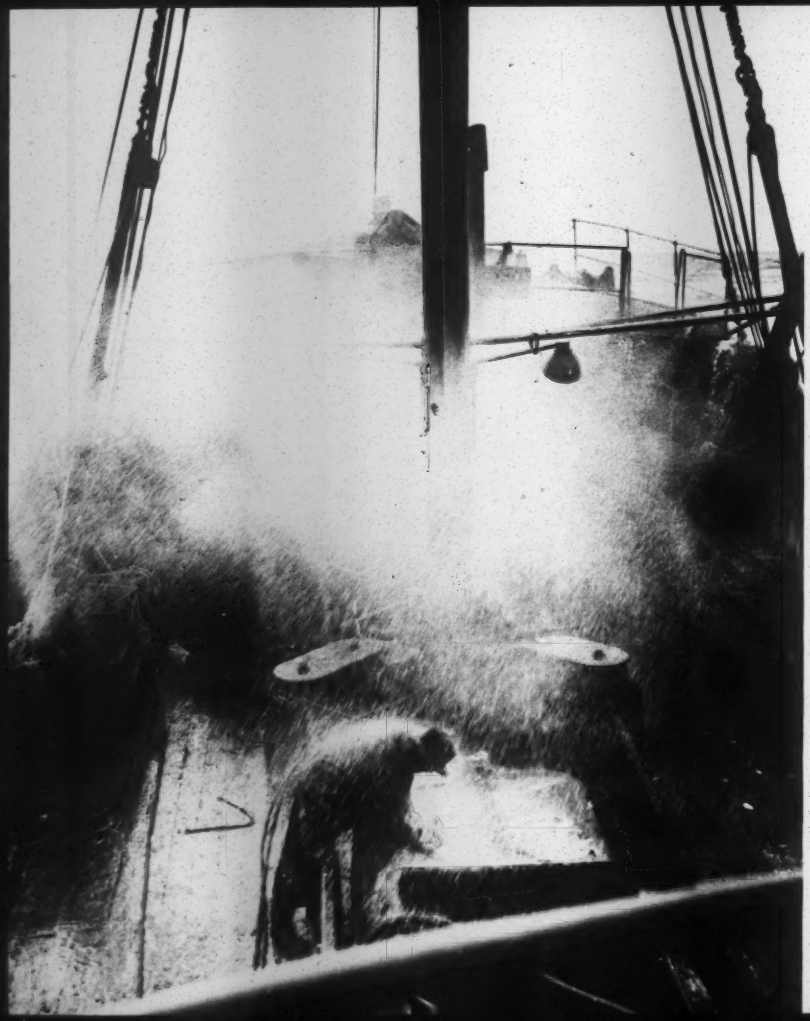

New England Sea Harvest

Photographs by Robert F. Sisson,
National Geographic Photographer

SPRAY RAINS DOWN like a cloudburst, testing the seaworthiness of the fisherman's oilskin. His feet slip on the tossing deck; the wind brings tears to his eyes.

To a Boston trawlerman it's all in a day's work. He cleans his fish, stows them below in ice, and turns to the next netload.

To capture the million dollar harvest of the sea, today's deep sea fisherman uses a rig called an otter trawl. The ship drags the net like a giant funnel through the water at the end of 400-fathom wire cables (far right). Heavy wooden rollers, each the size of an automobile wheel, are attached to the lower lip of the net to hold it close to the bottom where the haddock and cod feed. Hollow metal floats buoy the top edge.

Two large "doors" complete the rig. The doors, set at an angle, keep the net mouth open.

The trawl is pulled through the water at 6 or 7 knots. Fish are scooped into the gaping mouth of the net to be trapped in the narrow "cod end." Thirty to 90 minutes of trawling fill the net.

As the captain watches from the bridge (cover), the big net is pulled close to the ship by winch. The slack is hand-hauled over the rail until the cod end is alongside (right).

A hook lifts it over the deck, a crewman looses the easily untied

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halibut. Unmarketable fish like dogfish, skate, monkfish, and sculpins are dumped overboard.

After cleaning, the catch is pitched into the hold where a man packs it in ice—three tons of fish to one ton of ice. A regular shift of six men can dress and pack 5,000 pounds of fish in one hour.

When the trawler returns to Boston after about 10 days fishing off New England, Nova Scotia, or Newfoundland, crewmen will unload some 100,000 pounds of fish at the Boston Fish Pier. Fresh fish will appear at markets within a radius of 500 miles. Within days frozen fillets will lie temptingly on tables from Marblehead to Minneapolis.

"Cod" has long been Boston's middle name. The port is the leading source of fin fish in the country; one of the world's finest fisheries is found in North Atlantic coastal waters. Cold currents from the north, rich in dissolved nutrients, support lush pastures of tiny sea plants, which in turn provide food for armadas of fish (See *Geographic School Bulletins,* March 13, 1961). In 1960, Boston trawlermen netted 154,300,000 pounds of Atlantic haddock and cod, a haul worth more than $14 million.

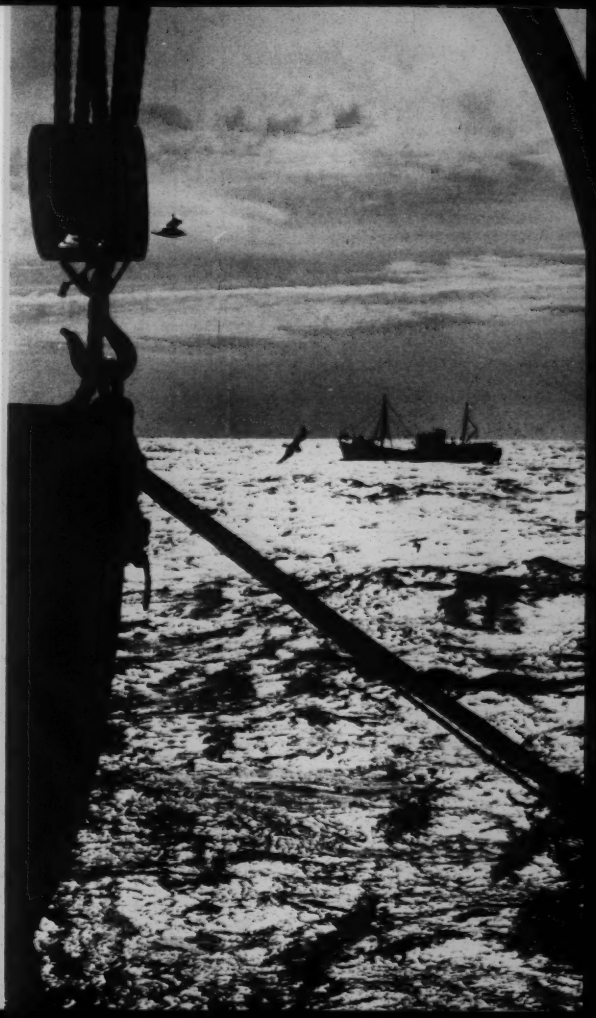
To discover where the big hauls can be found, trawlers today use fathometers. Underwater sound bounces off the bottom to map its contours. Knowing the bottom topography, the captain can choose the best place to drag his net.

FISH AND WILDLIFE SERVICE

Trawler captains seek shoal areas off New England, Nova Scotia, and Newfoundland (shaded on map). Cape Cod's finger nudges Georges Bank. Other fishing grounds stretch northward to triangular Grand Banks, one of the world's best sea pastures.

With trawlers like these sweeping coastal waters the year around, won't the Atlantic banks soon become fished out?

Not if present conservation measures continue, marine biologists say. Delegates from 17 North Atlantic fishing nations in 1957 agreed that no trawl net should have a mesh smaller than 4½ inches. Young fish slip through the seine to grow to maturity and provide rewarding catches for the future. A.P.M.



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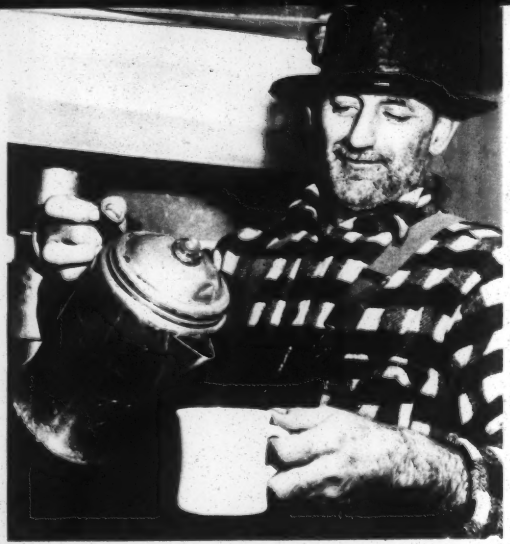
AFTER WORK, IT'S 'MUG-UP' TIME

On the banks, trawlermen work six-hour shifts around the clock. When not busy boating fish, they repair torn nets. Fisherman, left, holds his knife in his teeth while mending a tear. Instead of reweaving the net as in former days, he will simply stitch in a prefabricated section.

Work done, it's "mug-up" time, right, when a cup of hot coffee takes away the chill. Eating aboard a tossing ship takes skill. Experienced sailors hold soup bowls in their hands, left. Upright boards across the table and a Lazy Susan for condiments help keep dinner on the table. Menus call for plenty of good, red meat. How about fish? "Only as an appetizer," a hungry veteran says.

At the end of a hard day, the bunk is the best medicine for tired bones, below.



1930, the League of Nations investigated. A report accused the Americo-Liberians of practices resembling slavery.

Recently Liberian policy has aimed at integration of the tribesmen, and many barriers have fallen. Men from the tribes now hold high government offices and serve in the legislature.

For decades the chief economic prop of Liberia was the Firestone rubber company. In the 1920's British and Dutch interests in the Far East controlled most of the world's rubber, and American buyers were forced to pay whatever prices they set.

To break the monopoly Firestone company set up vast plantations in Liberia, now totaling 100,000 acres. By providing employment for many Liberians, and giving the country a major export crop, the plantations saved Liberia from bankruptcy.

Since World War II, Liberia has had a boom. The Firestone plantations have been joined by the B. F. Goodrich Company and enlarged Liberian-owned plantings.

But rubber no longer carries the entire load. Some of the richest iron ore in the world—68 per cent metal—is shipped from vast deposits in the Bomi Hills. Other huge reserves await exploitation.

With foreign capital, including United States aid money, Liberia forges ahead. Her citizens build roads, bridges, railroads, and schools; new crops are tested. Brickworks (left) provide construction material.

Although neither a colony nor a satellite of the United States, Liberia shows many evidences of American influence, carried there by the one-time slaves. English is the official language, the dollar the official currency. The capital, Monrovia (above left), was named for President James Monroe. The constitution is patterned closely after that of the United States.

F.S.

Milking rubber trees. Bucket-bearing latex tappers on a Firestone plantation in Liberia file through a grove to gather the white liquid from scarred and dripping trees. Below, a workman cuts a sheet of crepe rubber for baling and export to the United States. Behind him others grade the sheets on light tables.

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AFRICA'S OLDEST REPUBLIC

IN LIBERIA, the colonists were Negroes. Alone among the nations of West Africa, Liberia never had white overlords.

Ringed by newly-independent countries formed in Africa's upsurge of nationalism, Liberia can boast of more than 100 years as a free and independent nation. Today it can also boast a rapidly growing economy.

The formation of Liberia came as one of the odd effects of the slave trade. In the early days of the United States there was much interest in possibly returning freed slaves to their ancestral continent. In the early 1820's several private associations were formed for this purpose, and the first volunteers were landed on Africa's west coast. The former slaves bought land from the local tribes, paying out, among other items:

PHOTOGRAPHS BY NATIONAL GEOGRAPHIC PHOTOGRAPHER W. D. VAUGHN

Six muskets, one barrel of powder, six iron bars, 10 iron pots, one barrel of beads, two casks of tobacco, 12 knives, 12 forks, 12 spoons, one barrel of nails, one box of pipes, three mirrors, four umbrellas, three walking sticks, one box of soap, one barrel of rum, four hats, three pairs of shoes, six pieces of blue cloth, and three pieces of white calico.

Disease and attacks by tribesmen almost wiped out the little settlement, but additional colonists came in, and by 1847 the freedmen felt strong enough to declare Liberia (from the Latin *liber,* free) a nation.

Economic and political growth of the Ohio-sized country was agonizingly slow. The descendants of the ex-slaves, calling themselves Americo-Liberians, controlled the country and appropriated what little wealth there was to their own uses.

Exploitation of the tribesmen as laborers led to abuses, and, in

to keep the channel clear. Alligators watch the freighters from green jungle-clad islands; monkeys chatter in the trees. The heat of the tropics bathes the crew. Ahead loom Gatun Locks, which return the ship to sea level.

The ship pushes out into Limon Bay. Two launches put out from shore. Pulling alongside, the launches unload supplies to the freighter. The pilot who has taken the ship through the Canal clambers down a rope ladder to catch a launch and the 4:30 train back to Balboa.

The freighter whistles a parting salute. Next stop: New York. Or Liverpool, Rotterdam, or Marseille.

Ever since Balboa stood "silent, upon a peak in Darien" and discovered the Pacific Ocean, men have dreamed of a canal across Central America.

But not until 1880 did anyone try to build one. Bankruptcy and tropical diseases defeated the French attempt. The United States took over their equipment and made an agreement with Panama, newly-independent from Colombia. In 1904, for $10,000,000 and an annual rent, the U. S. was granted permanent use and control of the Canal Zone—a strip of land 10 miles wide straddling the Canal.

Building the Canal took 10 years. Disease and landslides constantly interrupted work. In 1914 the S. S. *Ancon* made the first complete trip through—from Atlantic to Pacific—making a reality of the Zone's motto: "The Land Divided, the World United."

The Canal's value to world trade is tremendous in terms of time and money saved. Dredges are widening and deepening parts of the treacherous Gaillard Cut. Fluorescent lighting for locks and channels aids night transits. New locomotives are on order, and an electronic ship-dispatching system is projected for 1963. L.B.

BRADLEY SMITH, RAPHO-GUILLUMETTE

Palm-fringed Panama City, capital of the Republic of Panama, sprawls near the Pacific entrance to the Canal. Spanish conquistadors founded it four centuries ago. Peruvian gold flowed through it on the way to Spain. The Pan American Highway will bring to its streets the people of two continents.

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PANAMA CANAL

The big ditch that divides the land to link the oceans

KIP ROSS, NATIONAL GEOGRAPHIC STAFF

THE HIGHWAY BRIDGE swings away. The freighter, towed by electric "mules," glides through Miraflores Locks near the port of Balboa. The eight-hour trip from Pacific to Atlantic begins.

Behind this ship others wait at anchor for pilots to board and guide them through the Panama Canal. Perhaps a Honduran banana boat is next in line, followed by a German freighter, a Liberian tanker, and a British tramp. At the Atlantic end of the Canal other merchantmen line up to sail toward the Pacific.

Some 30 ships a day use this 50-mile shortcut between the Atlantic and Pacific. It shortens a trip from San Francisco to New York, for example, by 8,000 miles.

For the freighter's crew, the sun rose out of the Pacific this morning and will set over the Caribbean tonight. This seemingly backward geography stems from the S-shape of the Isthmus of Panama. The Canal slices through the twisting land with its Atlantic end west of its Pacific end.

The "mules," little locomotives riding tracks along both sides of the Canal, will move the freighter through two more sets of locks. Pedro Miguel Locks, like Miraflores, will lift the ship—the last step in the 85-foot climb to the level of Gatun Lake.

The channel that leads to the lake is called Gaillard Cut. It is a narrow, twisting, jungle-walled ditch chiseled out of the hills. At each sharp bend a signal station indicates what's around the bend, and just before the sharpest turn, big white "W's" have been set on the bank: they mean "whistle"—to warn approaching ships.

Out of the Cut, the ship steams to Gatun Lake, 20 miles across. Here water hyacinths grow so profusely that a special hyacinth patrol destroys some 42 million plants a year

KIP ROSS, NATIONAL GEOGRAPHIC STAFF

Jungle Outpost: El Real (right). Drenched under a sample of the approaching rainy season, the Trans-Darién Expedition stops for an oil check 71 miles from the Colombian border. The adventurers' arrival brought cheers from the 800 residents of this thatched town on stilts, for it forecast the arrival of the highway and new prosperity.

member of the group. He recorded his adventures in the March 1961 *National Geographic*.

The expedition inched along, often in low-low gear, following a hacked trail from Chepo to the Colombian border, a theoretical 186 miles. Winding trails, slipping wheels, and steep slopes pushed the odometers of the Jeep and Land-Rover to 271 miles. What would be a pleasant afternoon's drive through the turnpike-striped United States took the adventurers 101 days—an average of less than three miles a day.

The men who finally lay the highway through Darién must be bridge builders. The expedition crossed 26 rivers, 180 creeks and ravines, and built 125 bridges of palm logs.

Most of the way they chopped through jungle (above). "Our woodsmen ranged ahead, chopping and slashing a way for the cars," Mr. Ross writes. "Where ravines sliced across the path, axes felled trees for makeshift bridges. Behind the advance crew, outriders on the front fenders kept an eye out for small stumps or hidden holes in the leaf-strewn floor of the jungle. Sharp spikes could slash a tire; camouflaged holes could swallow a wheel and break a spring or axle."

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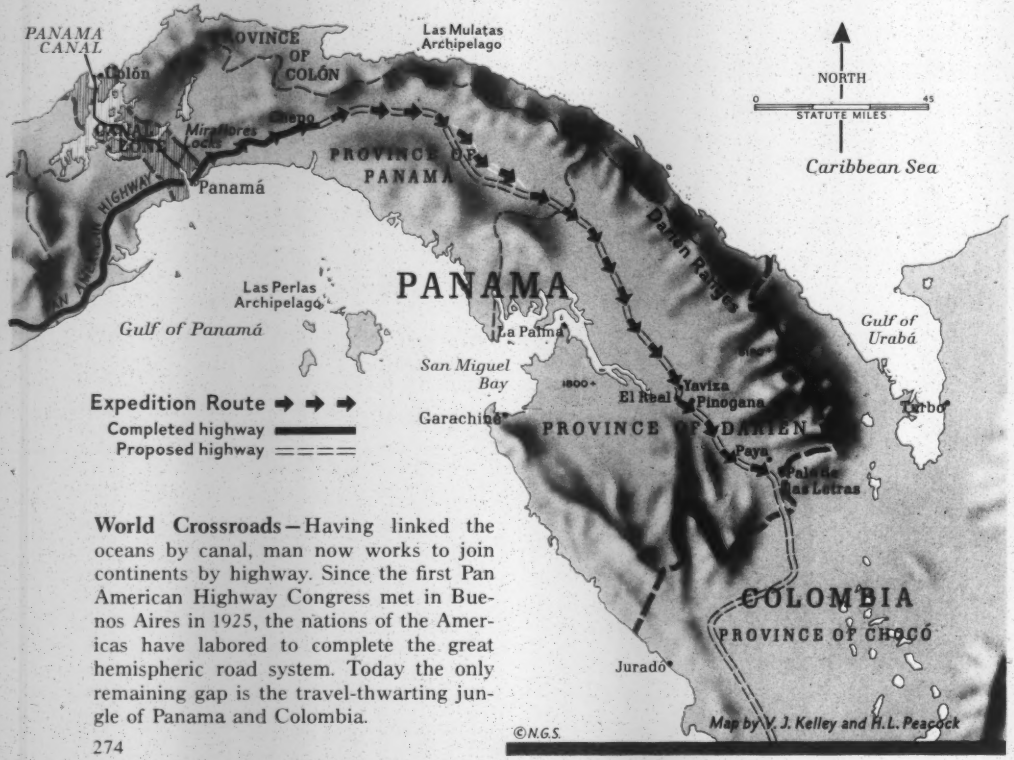
Blazing the Pan American Trail



World Crossroads—Having linked the oceans by canal, man now works to join continents by highway. Since the first Pan American Highway Congress met in Buenos Aires in 1925, the nations of the Americas have labored to complete the great hemispheric road system. Today the only remaining gap is the travel-thwarting jungle of Panama and Colombia.

AS THE PANAMA CANAL connects east and west, the Pan American Highway system will link north and south. From Circle, Alaska, to Puerto Montt, Chile, this 19,000-mile ribbon of road will tie together the Western Hemisphere.

In a few spots in Costa Rica and western Panama travel by ordinary automobile is difficult and sometimes impossible, particularly during the rainy season. But a road of sorts exists uninterrupted as far south as Chepo, Panama. Then it disappears for 596 miles until it resumes at Manizales, Colombia.

This gap includes Colombia's vast, undeveloped province of Chocó and Panama's eastern province of Darién. So impenetrable is this region that for centuries men have ferried around it by sea. Incredibly dense jungle, soaring temperatures, swollen rivers, and poisonous snakes make travel almost impossible.

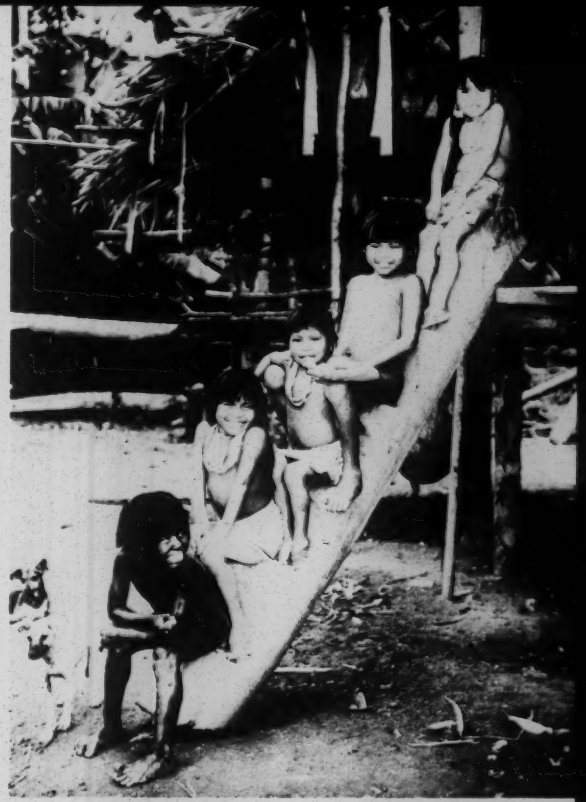
Recently a Jeep pickup truck and a Land-Rover, carrying an expedition sponsored by the Pan American Highway Congress, made the first vehicular crossing of the Panamanian section of this forbidding region. The information collected will help road builders plan the last link in the hemisphere-spanning highway.

Kip Ross of the National Geographic Society's Foreign Editorial Staff was a

Chocó Indians stole out of the brush to stare at the vehicles, then silently disappeared. The Chocó below paddles his bananas down the Tuira River to a freighter. Today many Chocós use outboard motors. Tomorrow they may ship by truck.

"Statesmen and farsighted citizens have recognized the need for an unbroken land link between the continents—a tangible avenue of understanding, of commerce, of mutual defense," writes Mr. Ross. "To the United States it means an opportunity to strengthen its traditional bonds of friendship with Latin American neighbors." L.B.

OTIS IMBODEN, KIP ROSS, NATIONAL GEOGRAPHIC STAFF, RIGHT



Chocó children line up on the log stairway into their home. Boy at the bottom wears a black vegetable dye the tribe uses for decoration. At night the log is turned over to keep out dogs.

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